phyry mountain in all directions. This mountain covers at its base about seventy acres, more or less, and is furrowed by deep cuts near its summit; some of these to a depth of eighty to one hundred feet. The best and purest ore is that which was found lying on the surface of its slopes, and of this there is still a very large quantity; but the large boulders have been almost all removed, while that which remains is so finely divided and so mixed with the clay and soil that any ordinary method of separation would make it too expensive.

Lately, the California hydraulic mining has been applied to win this ore, with great success. Water is pumped through large hoses which are led up the sides of the hills, and the debris is washed down through sluice-boxes and over small falls, which agitate it sufficiently to shake the ore from the dirt and allow it to deposit at the foot of the hill by virtue of its higher specific gravity, in receptacles provided for it. The remaining ore is obtained by blasting, is loaded on a gravity railway and carried to the foot of the mountain, where it is dumped, three or four tons at a time, over a shoot which precipitates it some eight or ten feet, upon the flats of the Iron Mountain Railroad Company, which are awaiting it. The shock as this heavy weight strikes the cars is great enough to cause them sometimes to tilt over on two wheels. How much it increases the wear and tear I was unable to ascertain.

This ore contains from 65 to 68 per cent. metallic iron, associated with 0.031 per cent. to 0.11 per cent. phosphorus and 4 to 4.5 per cent. silica, and a trace of sulphur. The quantity exposed is enormous, but was stated by Mr. David Thomas, of Catasauqua, not to equal in quantity the celebrated Cornwall mines of this State.

The ore from Pilot Knob is much more sandy than that from Iron Mountain. It occurs in a bed dipping with the general dip of the country rock, and inclosed within the porphyry out of which the knob is formed. The formation of this ore is a most interesting study, and the only plausible theory seems to be that of lateral replacement, a case of metasomatism where the porphyry, having become slaty in structure, and less capable of resisting the solvent, has been replaced along the line of strike, and only in such laminated parts. This ore is banded in appearance, and is almost, if not quite, invariably hematite.

June 16.

The President, Dr. Ruschenberger, in the chair.

Twenty-five members present.

Notice of some Fresh-water and Terrestrial Rhizopods.—Prof. Leidy stated that among the amœboid forms noticed by him in

the vicinity of our city, there was one especially remarkable for the comparatively enormous quantity of quartzose sand which it swallowed with its food. The animal might be viewed as a bag of sand! It is a sluggish creature, and when at rest appears as an opaque white, spherical ball, ranging from $\frac{1}{8}$ to $\frac{3}{8}$ of a line in diameter. The animal moves slowly, first assuming an oval and then a clavate form. In the oval form one measured $\frac{3}{5}$ of a line long by $\frac{2}{5}$ of a line broad, and when it became clavate it was $\frac{2}{3}$ of a line long by $\frac{1}{8}$ of a line broad at the advanced thick end. Another, in the clavate form, measured $\frac{7}{8}$ of a line long by $\frac{1}{3}$ of a line wide at the thick end. The creature rolls or extends in advance while it contracts behind. Unless under pressure it puts forth no pseudopods, and the granular entosarc usually follows closely on the limits of the extending ectosarc. Generally the animal drags after it a quantity of adherent dirt attached to a papillated or villous discoid projection of the body.

The contents of the animal besides the granular matter and many globules of the entosarc, consists of diatomes, desmids, and confervæ, together with a larger proportion of angular particles of transparent and mostly colorless quartz. Treated with strong mineral acids so as to destroy all the soft parts, the animal leaves behind more than half its bulk of quartzose sand.

The species may be named AMŒBA SABULOSA, and is probably a member of the genus *Pelomyxa*, of Dr. Greef (*Archiv f. Mik. Anat.*, x, 1873, 51).

The animal was first found on the muddy bottom of a pond, on Dr. George Smith's place, in Upper Darby, Delaware County, but has been found also in ponds in New Jersey.

When the animal was first noticed with its multitude of sand particles, it suggested the probability that it might pertain to a stage of life of *Difflugia*, and that by the fixation of the quartz particles in the exterior, the case of the latter would be formed. This is conjectural and not confirmed by any observation.

A minute amœboid animal found, on *Spirogyra*, in a ditch at Cooper's Point, opposite Philadelphia, is of interesting character. The body is hemispherical, yellowish, and consists of a granular entosarc with a number of scattered and well-defined globules, besides a large contractile vesicle. From the body there extends a broad zone, which is colorless and so exceedingly delicate that it requires a power of 600 diameters to see it favorably. By this zone the animal glides over the surface. As delicate as it is, it evidently possesses a regular structure, though it was not resolved under the best powers of the microscope. The structure probably consists of globular granules of uniform size alternating with one another, so that the disk at times appears crossed by delicate lines, and at others as if finely and regularly punctated. The body of the animal measures from $\frac{1}{66}$ to $\frac{1}{50}$ of a line in diameter, and the zone is from $\frac{1}{333}$ to $\frac{1}{200}$ of a line wide. The species may be named AMŒBA ZONALIS.

The interesting researches of Prof. Richard Greef, of Marburg, published in the second volume of Schultze's *Archiv f. Mikroskopische Anatomie*, on Amœbæ living in the earth (*Ueber einige in der Erde lebende Amœben, etc.*), led me to look in similar positions for Rhizopods.

In the earth about the roots of mosses growing in the crevices of the bricks of our city pavements, in damp places, besides finding several species of *Amœba*, together with abundance of the common wheel-animalcule, *Rotifer vulgaris*, I had the good fortune to discover a species of *Gromia*. I say good fortune, for it is with the utmost pleasure I have watched this curious creature for hours together. The genus was discovered and well described by Dujardin, from two species, one of which, *G. oviformis*, was found in the seas of France; the other, the *G. fluviatilis*, in the River Seine.

Imagine an animal, like one of our autumnal spiders stationed at the centre of its well-spread net; imagine every thread of this net to be a living extension of the animal, elongating, branching, and becoming confluent so as to form a most intricate net; and imagine every thread to exhibit actively moving currents of a viscid liquid both outward and inward, carrying along particles of food and dirt, and you have some idea of the general character of a *Gromia*.

The *Gromia* of our pavements is a spherical cream-colored body, about the $\frac{1}{16}$th of a line in diameter. When detached from its position and placed in water, in a few minutes it projects in all directions a most wonderful and intricate net. Along the threads of this net float minute naviculæ from the neighborhood, like boats in the current of a stream, until reaching the central mass they are there swallowed. Particles of dirt are also collected from all directions and are accumulated around the animal, and when the accumulation is sufficient to protect it, the web is withdrawn and nothing apparently will again induce the animal to produce it.

From these observations we may suppose that the GROMIA TERRICOLA, as I propose to name the species, during dry weather remains quiescent and concealed among accumulated dirt in the crevices of our pavements, but that in rains or wet weather the little creature puts forth its living net which becomes so many avenues along which food is conveyed to the body. As the neighborhood becomes dry, the net is withdrawn to await another rain. The animal with its extended net can cover an area of nearly half a line in diameter. The threads of the net are less than the $\frac{1}{30000}$th of an inch in diameter.

Remarks on the Revivification of Rotifer vulgaris.—Prof. LEIDY remarked that during the search for Rhizopods, having noticed among the dirt adhering to the mosses in the crevices of

our pavements many individuals of the common wheel-animalcule, *Rotifer vulgaris*, he had made some observations relating to the assertion that they might be revivified on moistening them after they had been dried up.

Two glass slides, containing, beneath cover glasses, some dirt, exhibited each about a dozen active living Rotifers. The glass slides were placed on a window ledge of my study, the thermometer standing at 80°. In the course of half an hour the water on the slides was dried up and the dirt collected in ridges. The next morning, about twelve hours after drying the slides, they were placed beneath the microscope. Water was applied and the materials on the slides closely examined. On each slide a number of apparently dried Rotifers were observed. These imbibed water and expanded, and some of them in the course of half an hour revived and exhibited their usual movements, but others remained motionless to the last.

The same slides were again submitted to drying, and from one of them the cover glass was removed. They were examined the next day, but several hours after moistening them only two Rotifers were noticed moving on each slide.

I next prepared a slide on which there were upwards of twenty actively moving Rotifers, and exposed it to the hot sun during the afternoon. On examination of the slide the following morning, after moistening the material, all the Rotifers continued motionless, and remained so to the last moment.

From these observations it would appear that the Rotifers and their associates became inactive in comparatively dry positions and may be revived on supplying them with more moisture, but when the animals are actually dried they are incapable of being revivified. Moisture adheres tenaciously to earth, and Rotifers may rest in the earth, like the *Lepidosiren*, until returning waters restore them to activity.

Prof. COPE mentioned the capture of a young *Balæna cisarctica*, of forty-eight feet in length, in the Raritan River, near South Amboy, on May 30th. The skeleton was buried and would be preserved in some museum. He examined the whalebone, of which there are 245 laminæ on each side of the mouth. The color is black and the hair is fine, long, and has a brownish tinge; length of longest plate with hair, 48 inches. The gum is 116 inches long and 11 inches deep. He was informed that the whale was entirely black, and the dorsal line without irregularities.

Prof. COPE exhibited mounted crania of some gigantic horned mammalia of the Miocene of Colorado, viz., the *Symborodon bucco*, *S. altirostris*, *S. acer*, *and S. trigonoceros*. He explained the distinctive features of this genus as compared with *Titanotherium*, exhibiting typical specimens of the latter from the Academy's museum, showing four inferior incisor teeth, while the

lower jaw of *Symborodon* does not possess any. He pointed out that these animals had small brains, with few convolutions, which were separated by deep fissures occupied by thin bony laminæ, and that the falx and tentorium are well developed. He pointed out the relatively small size of the brain, and that at least half of the length of the cranium is occupied by enormous, undivided frontal sinuses. Each of these communicates with the nasal meatus by an elongate foramen, and enters the base of the corresponding horn core. He stated that similar sinuses exist in the cranium of *Eobasileus*, and enter the basis of the middle pair of horns in the same manner.

June 23.

The President, Dr. Ruschenberger, in the chair.

Twenty-one members present.

On the Pelvis of Hadrosaurus.—Prof. B. Waterhouse Hawkins, having completed his model of Hadrosaurus at Princeton College, took the occasion to call the attention of the Academy to his success in placing certain fugitive bones belonging to Hadrosaurus, and also to its English cousin Iguanodon. It might be allowable to remind the meeting of the fact that in 1868, when he had made and presented the restoration of Hadrosaurus now in the museum, he then recognized the homologous character of a bone described by Dr. Leidy in his monograph of the Cretaceous Reptiles, to that which had become a fugitive bone in Iguanodon, the English representative of Hadrosaurus. These bones had been for many years appointed to the place of clavicles by Prof. Owen and Dr. Mantel, of England. When Mr. Hawkins made his large restoration of Iguanodon at the Crystal Palace, in 1853, his first difficulty was to find room for these so-called clavicles in his model, a task which he was obliged to abandon, as they were twice the size which the natural arrangement of the limbs rendered possible. A few days previous to his sailing for America he found that Prof. Huxley had been studying the same problem of their true position in the animal's body, concerning which he delivered an address before the Royal Institution. Prof. Huxley, on this occasion, transposed the pseudo-clavicles from the pectoral to the pelvic arch, where he arranged them either as pubic or ischiatic bones, and placed them as in the ostrich and rhea. At the same time this transposition was taken advantage of to suggest the probability of Iguanodon walking on its hind legs, thus accounting for some of the larger forms of bipedal footprints, and justifying the establishment of the new order Ornithosauria. On the arrival of Prof. Hawkins in America, after studying Dr. Leidy's description of Hadrosaurus, he found that Dr. L. had anticipated